NEW HORIZON CALCOFI ADCP MANUAL

APRIL 2005

Instructions for Jamie:AutoADCP

We hope to run VmDas, a Microsoft Windows data acquisition program for ADCPs, from the AutoADCP program. AutoADCP's purpose is to provide a method for unattended operation of shipboard ADCPs that use VmDas. CalCOFI NH0504 is our first use of both AutoADCP and VmDas. The primary functions of AutoADCP are to change configuration based upon the ship's location and to assure that data collection continues by means of a watchdog timer. At intervals, the AutoADCP routine determines the ship's position by reading the last GGA entry in the most recent *.N1R file (the text file where VmDas logs GPS data). This position is then compared with regions in the "position.dat" file. For CalCOFI, the position file determines the approximate boundary of the 500 m isobath, and the VmDas configuration should switch from "shallow.ini" to "deep.ini" based on location. In shallow water, we will run the ADCP in broadband mode with bottom track on and 3 sec between ensembles to account for a 2 ping cycle. In deep water, we will run the ADCP in narrowband mode, to maximize range, with a 2 sec ping cycle. Once the data acquisition begins, we would like you to fill out a log sheet at regular intevals each day. The purpose is, over the course of the cruise, to make sure that data acquisition continues. The items that you log should change with time (time should be current, the position should change and should match your current location, the ini file should change from shallow to deep and back again, and the data files should grow.) Aside from controlling the current configuration file, the AutoADCP routine periodically checks that the data collection process is continuing by checking the size of the *.ENR file (raw pingdata) of the highest numbered data collection session. If the *.ENR file has not changed in size since the last time it was queried, the routine assumes that data collection has stopped prematurely. It will use the Windows task manager to stop VmDas and then attempt to restart it and continue. This is referred to as a software watchdog. It will not protect against a system crash, so a human watchdog (YOU) is still greatly appreciated.

AutoADCP will not check the *.N2R file, where our Ashtech GPS heading logs. For that we will ask you to open a window in C:\ADCPDATA\ and periodically run a Unix tail/grep in order to log Ashtech heading and to check that it is updating. Ashtech acquisition has been problematic on New Horizon. If it stops, give the receiver a hard reset. It should not be necessary to restart AutoADCP or VmDas.

When you're close to port, Stop Data Collection, Stop VmDas, Quit the AutoADCP and copy everything in C:\ADCPDATA to a folder on the USB drive.

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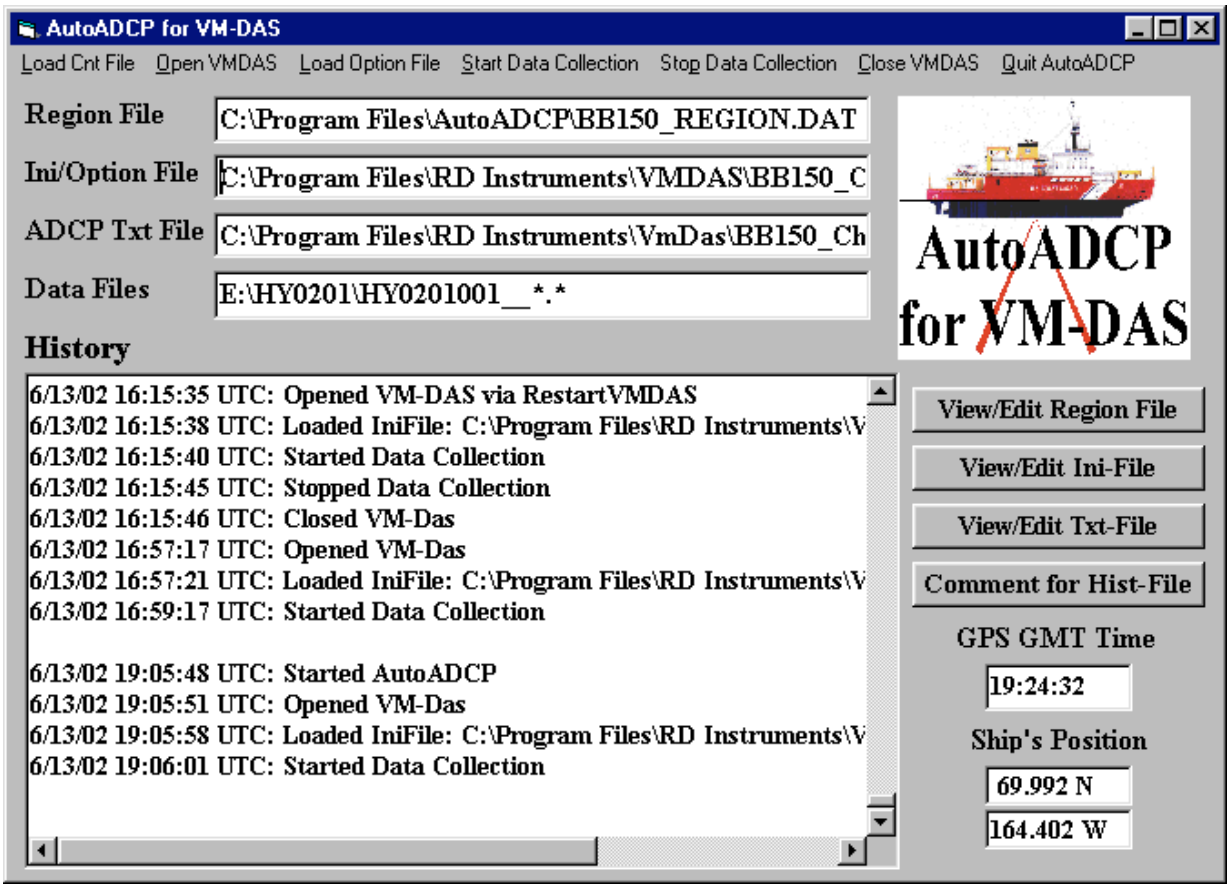

Figure 1. Illustration of the AutoADCP screen during data collection.

Running the AutoADCP

- Double click the AutoADCP desktop icon to start it.
- Options are listed in the menu across the top of the window (Fig. 1)
- Starting left, click on “Load Cnt File”. You will choose “C:\CalCOFI\AutoADCP\Autoadcp.cnt”. After the file loads, AutoADCP will have all of the path information that it needs to find other files. The name of the region file should display in the GUI and the History window will display any previous history.
- Next, click on “Open VmDas”. VmDas will open in a new window with a blank screen.
- “Load Option File” causes VmDas to collect data and to load the default option file. The VmDas screen should now show some displays. If that fails to happen, close VmDas using the menu button on the top of the AutoADCP GUI, then repeat the last 2 steps (open VmDas and load the options file.) At this point, the option and *.txt file names should display in the GUI. We initialize with calcofi_default.ini.

- "Start Data Collection" The output file preface will display in the GUI. GPS time and position remain blank until the navigation file is queried (about 1 min). Soon, AutoADCP should switch to shallow.ini (as you leave port).
- The ini/option file lets you know whether the program thinks you are shallow or deep. Our line is pretty crude (see Figure 2).
- At the end of the cruise, stop data collection from the AutoADCP, otherwise it may notice data collection has stopped and try to restart VmDas. Then close VmDas and quit AutoADCP using the menu buttons.

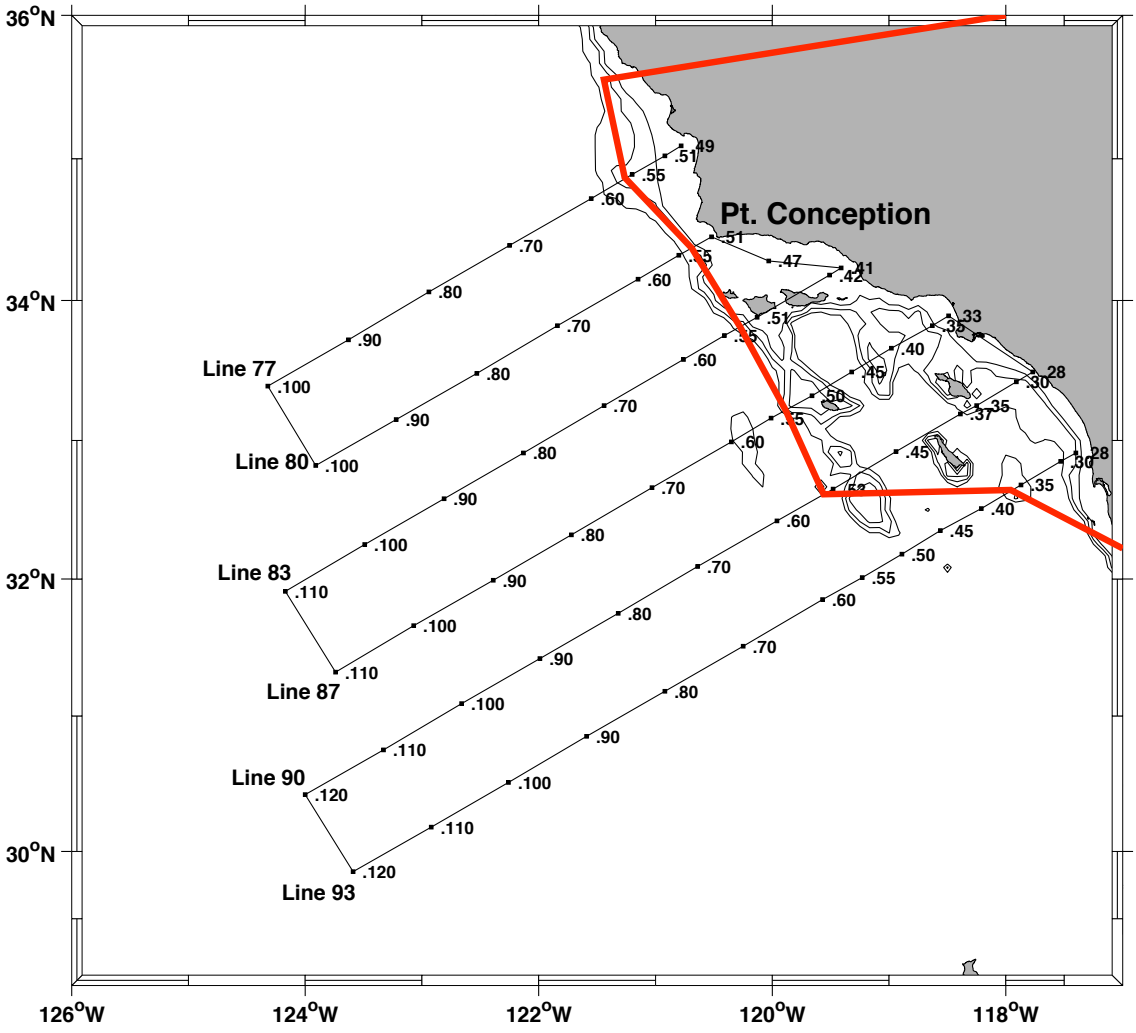

Figure 2. Boundary for changing fom shallow to deep ini file.

VmDas

This section gives instructions on how to run VmDas, should the AutoADCP system fail to work.

(1) Start VmDas (double click the icon on the desktop).

(2) File -> Collect Data

(3) Options -> Load -> Choose INI file (choose

C:\CalCOFI\AutoADCP\Default_calcofi.ini

(4) Control -> Go (to start data collection)

During the steam home, you will need to interrupt data collection and turn bottom track on.

(5) Options -> Load -> Choose INI file (choose shallow.ini)

C:\CalCOFI\AutoADCP\shallow.ini

INITIAL SETUP: VMDAS TABS

This section gives instructions on how to setup the New Horizon Ocean Surveyor 75 kHz for CalCOFI ADCP data collection. Each heading below describes the entries within a tab in the VMDAS setup screens. If the setup was verified in port, use this to start data collection and as a checklist for normal operation. To begin,

(1) Start VMDAS (double click the icon).

(2) File -> Collect Data

(3) Options -> Load -> Choose INI file (choose shallow.ini if you will toggle between deep and shallow; otherwise choose Default_calcofi.ini for the default setting)

CalCOFI ini and txt files are in the directory

C:\CalCOFI\AutoADCP

(4) Options -> Edit Data Options -> [see following sections ...]

Communications TAB

Options -> Edit Data Options -> Communications

Hardware setup:
(1) gyro going into the deck unit as a synchro feed

(2) pcode or other reliable GPS as a serial feed

(3) GPS heading device, such as ADU, POSMV, or Seapath as a serial feed. (Presently, the New Horizon has an ADU5 and the Melville has a POSMV.)

Set up com ports for ADCP, GPS positions, and GPS heading
- the GPS port gets written to the N1R files. It should have GGA and optionally VTG messages, but nothing else
- the GPS heading port gets written to the N2R files. It should also have a GGA message (if one is available), the attitude (heading and tilts) message, and any quality messages that are relavant. (For instance, a Seapath should have PSXN,20 for attitude, and PSXN,22 for quality.

NOTES
(1): until a VmDAS bug is fixed, if you have a POSMV, you should output

BOTH PRDID and PASHR messages. Then someone can use PRDID if they want, but the quality information is still there for later. (PRDID has no quality indicator)
(2) Keep the number of extra messages to a minimum. VmDAS can choke if it has too many serial messages. (The LOG files get really big and can stop data acquisition)

ADCP Setup TAB

Options -> Edit Data Options -> ADCP Setup

(1) Choose the text file to use under "ADCP setup from file".

Three likely scenarios are:

os75_bt.txt, **BOTTOM TRACK ON**, (loaded via shallow.ini)
If the cruise is going to be over shallow water (under 500m) for over 6 hours, transiting over a shelf for instance, it is a good idea to put it in bottom track mode. This helps with calibration of the data during processing and is a good sanity-check for the instrument, but it wastes too many pings if you're in open water. You need to lengthen the"Ensemble Time" (see below) to account for the fact that there are 2 pings per ensemble --a bottom track ping and then a water track ping.

os75_bb8.txt, **UPPER 500m**, higher precision mode. Use broadband pings with 8-meter resolution to get better vertical resolution and higher precision at the expense of depth penetration.

os75_nb16.txt, **DEEP OCEAN**, (loaded via deep.ini) lower precision mode. This is the preferred mode for CalCOFI. If the cruise is in the open ocean and the scientists on board are interested in currents as deep as possible, use narrowband pings with 16-meter bins. Deepest profiles might be to 800m, but with lower vertical resolution.

scenario	text file	"Ensemble Time"	
BOTTOM TRACK	os75_bt.txt	3	
UPPER 500m	os75_bb8.txt	2	
DEEP	os75_nb16.txt	2	(**best default**)

*** double these durations for 38KHz
** remember, when RDI put together their defaults, they were being conservative, but

this is at the expense of the number of pings in the water.

(2) Set time between Ensembles. We recommend loading a new ini file when you change configs - the ini file loads the correct text file AND changes the time between ensembles will be changed automatically. Otherwise you have to do 2 things manually, in the gui.: load the text file and change the time between ensembles.

Change the gui "Ensemble Time" so it is
consistent with your instrument's frequency. This is done to maximize
the number of pings that go in the water. The RDI default settings are
conservative (i.e. they are designed so you won't have ruined data; but you
do have fewer pings per average).

NOTE: "Ensemble Time" here refers specifically to the bottom of the "ADCP Setup" Tab, and it refers to the "seconds between ensemble" (where an ensemble is usually just one watertrack ping, or might be a pair of pings: one bottomtrack ping and one watertrack ping). This setting DOES NOT have anything to do with the averaging of the data later.** It is important to remember to change the "Ensemble Time" to match the ping pattern. The computer actually tells the instrument when to ping; the ADCP doesn't figure that out for itself. If it's too small, you may have interference. If it's too large, you waste the opportunity to ping.

Recording TAB

Options -> Edit Data Options -> Recording

Data should record to the directory

C:\ADCPDATA (primary)

C:\ (secondary)

It's probably easiest to have the data always end up in the same directory and choose a new deployment name to use; this name will be part of the VMDAS file names. Then after the cruise you can stop logging and use a file browser to move the data to a different directory.For CalCOFI data, we choose calcofi.

Max size 2-5Mb (We use 5Mb or they're too large to load easily)

You choose whether there is a dual output directory (but don't write to a
networked disk -- it tends to cause problems)

Transform TAB

Heading Source: choose ADCP compass/gyro (better for reliability)

Tilt source: We choose to set the tilts manually to zero.

***DO NOT* ENABLE heading correction because we want the txt file to have precendence (see p. 56 in the VMDAS user manual).**

EV (set to 0)

EA (fixed transducer misalignment)
There should be only one EA command in use, but it can be in one of two places.
- If you are using a text file, there is an EA command which we set to match
the NH alignment (EA045). In that case, the EA command in the gui should be zero AND heading correction should not be enabled. VmDAS
will use the value from the text file

- **DO NOT ENABLE tilt correction**
None of these things should change between cruises.

Averaging TAB

60 seconds for STA (short time averages)
The standard for ADCPs is 5 minutes or 300 seconds (for LTA)
ENABLE reference layer, bins 3-10 is fine.

Data Screening TAB

not needed

User Exits TAB

not needed

Simulated Inputs TAB

not needed

OS75_BB8.TXT

```
;-------------------------------------------------------------------------\
; ADCP Command File for use with VmDas software.
;
; ADCP type:     75 Khz Ocean Surveyor
; Setup name:    default
; Setup type:    High resolution, short range profile(broadband)
;
; NOTE:  Any line beginning with a semicolon in the first
;        column is treated as a comment and is ignored by
;        the VmDas software.
;
; NOTE:  This file is best viewed with a fixed-point font (e.g. courier).
; Modified Last: 12August2003
;-------------------------------------------------------------------------/

; Restore factory default settings in the ADCP
cr1

; set the data collection baud rate to 38400 bps,
; no parity, one stop bit, 8 data bits
; NOTE:  VmDas sends baud rate change command after all other commands in
; this file, so that it is not made permanent by a CK command.
cb611

; Set for broadband single-ping profile mode (WP), eighty (WN) 8 meter bins (WS),
; 8 meter blanking distance (WF), 390 cm/s ambiguity vel (WV)
NP0
WP00001
WN080
WS0800
WF0800
WV390

; DISABLE single-ping bottom track (BP),
; Set maximum bottom search depth to 1200 meters (BX)
BP000
BX12000

; output velocity, correlation, echo intensity, percent good
WD111100000

; One and a half seconds between bottom and water pings
TP000150
```

; Three seconds between ensembles
; Since VmDas uses manual pinging, TE is ignored by the ADCP.
; You must set the time between ensemble in the VmDas Communication options
TE00000150

; Set to calculate speed-of-sound, no depth sensor, external synchro heading
; sensor, no pitch or roll being used, no salinity sensor, use internal transducer
; temperature sensor
EZ1020001

; Output beam data (rotations are done in software)
EX00000

; Set transducer misalignment (hundredths of degrees) CHECK THIS
EA04500

; Set transducer depth (decimeters) CHECK THIS
ED00050

; Set Salinity (ppt)
ES35

; save this setup to non-volatile memory in the ADCP
CK

OS75_NB16.TXT

```
;-------------------------------------------------------------------------\
; ADCP Command File for use with VmDas software.
;
; ADCP type:     75 Khz Ocean Surveyor
; Setup name:    default
; Setup type:    Low resolution, long range profile(narrowband)
;
; NOTE:  Any line beginning with a semicolon in the first
;        column is treated as a comment and is ignored by
;        the VmDas software.
;
; NOTE:  This file is best viewed with a fixed-point font (e.g. courier).
; Modified Last: 12August2003
;-------------------------------------------------------------------------/

; Restore factory default settings in the ADCP
cr1

; set the data collection baud rate to 38400 bps,
; no parity, one stop bit, 8 data bits
; NOTE:  VmDas sends baud rate change command after all other commands in
; this file, so that it is not made permanent by a CK command.
cb611

; Set for narrowband single-ping profile mode (NP), fifty (NN) 16 meter bins (NS),
; 8 meter blanking distance (NF)
WP0
NN050
NP00001
NS1600
NF0800

; DISABLE single-ping bottom track (BP),
; Set maximum bottom search depth to 1200 meters (BX)
BP000
BX12000

; output velocity, correlation, echo intensity, percent good
ND111100000

; One and a half seconds between bottom and water pings
TP000150

; Three seconds between ensembles
```

; Since VmDas uses manual pinging, TE is ignored by the ADCP.
; You must set the time between ensemble in the VmDas Communication options
TE00000150

; Set to calculate speed-of-sound, no depth sensor, external synchro heading
; sensor, no pitch or roll being used, no salinity sensor, use internal transducer
; temperature sensor
EZ1020001

; Output beam data (rotations are done in software)
EX00000

; Set transducer misalignment (hundredths of degrees) CHECK THIS
EA04500

; Set transducer depth (decimeters) CHECK THIS:
ED00050

; Set Salinity (ppt)
ES35

; save this setup to non-volatile memory in the ADCP
CK

OS75_BT.TXT;----------\
; ADCP Command File for use with VmDas software.
;
; ADCP type: 75 Khz Ocean Surveyor
; Setup name: default
; Setup type: High resolution, short range profile(broadband)
;
; NOTE: Any line beginning with a semicolon in the first
; column is treated as a comment and is ignored by
; the VmDas software.
;
; NOTE: This file is best viewed with a fixed-point font (e.g. courier).
; Modified Last: 12August2003
;----------/

; Restore factory default settings in the ADCP
cr1

; set the data collection baud rate to 38400 bps,
; no parity, one stop bit, 8 data bits
; NOTE: VmDas sends baud rate change command after all other commands in
; this file, so that it is not made permanent by a CK command.
cb611

; Set for broadband single-ping profile mode (WP), eighty (WN) 8 meter bins (WS),
; 8 meter blanking distance (WF), 390 cm/s ambiguity vel (WV)
NP0
WP00001
WN0080
WS800
WF0800
WV390

; Enable single-ping bottom track (BP),
; Set maximum bottom search depth to 1200 meters (BX)
BP001
BX12000

; output velocity, correlation, echo intensity, percent good
WD111100000

; One and a half seconds between bottom and water pings
TP000150

; Three seconds between ensembles

; Since VmDas uses manual pinging, TE is ignored by the ADCP.
; You must set the time between ensemble in the VmDas Communication options
TE00000300

; Set to calculate speed-of-sound, no depth sensor, external synchro heading
; sensor, no pitch or roll being used, no salinity sensor, use internal transducer
; temperature sensor
EZ1020001

; Output beam data (rotations are done in software)
EX00000

; Set transducer misalignment (hundredths of degrees) CHECK THIS
EA04500

; Set transducer depth (decimeters) CHECK THIS
ED00050

; Set Salinity (ppt)
ES35

; save this setup to non-volatile memory in the ADCP
CK